GROWTH OF EARTH SCIENCE IN THE SECONDARY SCHOOLS IN OHIO[1]

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ABSTRACT

A questionnaire survey of secondary-school principals revealed that there were 613 teachers teaching earth science in Ohio during the 1968–69 school year and that there were 50,180 students enrolled in earth science in 410 schools. Most of the schools are located in metropolitan centers in Ohio, but at least one school in 75 of the 88 counties in Ohio offers earth science. This survey revealed that Ohio should rank among the top several states in the number of students enrolled in a standard earth-science course.

The subject of earth science in the curricula of Ohio's secondary schools has undergone a rapid expansion in the last few years. In 1963–64, there were 60 earth science teachers in Ohio (Skinner, 1967). By 1966–67, the number of teachers had increased to 170 (Shappell and Mayer, 1968). Now there are over 600 earth science teachers in Ohio. The first two figures were compiled from Ohio secondary school principals' annual state reports; the last number was drawn from a questionnaire study which is the basis of this report.

A survey of the 1400 secondary school principals in Ohio, both junior high and high school, was sponsored, in the fall of 1968, by the Ohio State Department of Education, Title III, N.D.E.A., and The Ohio Academy of Science, to assess the status of earth science in Ohio's secondary schools. The principals were asked if earth science was taught, at any level, in their school systems and, if it was offered in their particular schools, to list the names of the teachers, the grade offered, the number of students, and the text used. The criterion for determining whether or not a school offered earth science was the name of the text. Only

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those schools who used a text listed in the references of this article were considered to be offering earth science.

One question on the questionnaire asked principals from schools where earth science was not offered whether the possibilities of offering earth science in their school system had been explored. The responses to this question revealed that approximately 50 percent of such principals favored the initiation of earth science into their schools' curricula.

After almost 1,000 questionnaires had been returned, a reminder letter was mailed to the nearly 250 schools from which no response had been received. The final return represented nearly a 90-percent response on the parts of the 1400 principals surveyed.

Number of Schools Offering Earth Science

Over half of the principals (556) indicated that earth science was offered in their school systems. Further examination of the responses revealed that, of these 556 schools, 410 had a regular course in earth science and used a *bona-fide* earth-science textbook, thus meeting the criterion identified in this study for offering earth science. Although the remaining 146 principals claimed that earth science was offered in their school systems, in 39 cases the earth science consisted only of units within their general science courses (a *bona-fide* earth science text was not used), and in the other 107 cases it was not actually offered in their particular schools, but was given in some other school in their system.

Areas in Ohio Where Earth Science is Taught

The greatest concentration of Ohio schools offering earth science is in the metropolitan centers. However, of Ohio's 88 counties, 75 have at least one school offering earth science. Table 1 lists all the counties with 10 or more schools offering earth science.

Numbers of Earth Science Teachers

A total of 613 teachers, at all grade levels, were reported by the 410 principals as teaching earth science. These teachers are concentrated in the eighth and ninth grades (Table 2).

Number of Students Enrolled in Earth Science

Five years ago (1963–64), there were 4,000 students enrolled in earth science courses in Ohio (Skinner, 1967). Today (1968–69), there are over 45,000 students. Most of these students are in the eighth and ninth grades, but a considerable number are in the seventh grade (Table 2).

The following figures (Table 3), taken from the October 1968 issue of the ESCP (*Earth Science Curriculum Project*) *Newsletter*, illustrate the great range in number of students taking earth science in the various states. In order to reflect the data of the present study, the Ohio figure has been updated and is much higher than the original figure reported by the State Science Supervisor when ESCP made its survey. In contrast, the figures reported to ESCP by the state supervisors of the various states were probably arrived at by various means and have not been updated, so the statistics are not directly comparable. However, the present study reveals that Ohio should rank among the top several states in the number of students enrolled in regular earth science courses.

Textbooks Used in Ohio

Table 4 lists the authors of the texts most used in Ohio and reveals the grade level at which each one is used. It is interesting to note that the *Earth Science Curriculum Project* text, *Investigating the Earth*, ranks third behind Namowitz and

TABLE 1

Number of Schools Offering Earth Science in Ohio 1968–1969

County	No. Schools
Cuyahoga	71
Franklin	26
Hamilton	23
Montgomery	18
Stark	16
Richland	14
Summit	13

TABLE 2

Summary of Earth Science Enrollment in Ohio's Secondary Schools 1968–69

Grade Offered	Teachers	Sections	Students
7th	71	259	6,770
8th	156	539	14,888
9th	254	686	18,902
10th–12th	104	205	5,204
Total	585	1,689	45,764
Special Earth Science Courses:			
TV Lessons Only	14	44	1,601
Astronomy & Geology	14	16	607
Total	28	60	2,208
Grand Total	613	1,809	50,180

TABLE 3

Numbers of Earth Science Students by State 1967–68

Pennsylvania	108,247	Michigan	6,000
Texas	99,195	Maine	5,728
North Carolina	76,500	Nebraska	5,672
Ohio	45,764	West Virginia	5,556
New York	40,000	Mississippi	5,500
South Carolina	27,114	Indiana	4,900
Virginia	26,749	Utah	3,390
New Jersey	20,367	Georgia	3,131
Minnesota	17,600	New Hampshire	2,872
Florida	17,577	Delaware	2,820
Illinois	16,900	Arkansas	2,740
Connecticut	14,614	Kansas	2,400
Washington	14,100	Vermont	2,360
Colorado	13,906	New Mexico	2,315
Wisconsin	12,983	Arizona	1,740
Maryland	12,739	Hawaii	1,500
North Dakota	11,676	Idaho	1,286
Oklahoma	9,476	Alabama	700
Missouri	9,000	Rhode Island	673
Iowa	8,267	South Dakota	557
Oregon	7,730	Alaska	500
Montana	7,332	Nevada	328
California	6,500	Tennessee	300
Louisiana	6,000	Kentucky	215
Massachusetts	6,000	Wyoming	134

Stone's *The World We Live In* and Ramsey and Burckley's *Modern Earth Science*, despite the fact that the ESCP book has been available only since 1967.

TABLE 4
Earth Science Textbooks by Grade Level

Textbook:	Schools at each grade level:				
	7th	8th	9th	10–12	Total
1. Blanc, Fishler, Gardner	3	2	1	0	6
2. Brandwein, *et al.*	3	0	1	0	4
3. E.S.C.P.	0	8	42	15	65
4. MacCracken, *et al.*	8	16	4	0	28
5. Namowitz and Stone	3	20	43	16	82
6. Navarra and Strahler	1	3	3	0	7
7. Ramsey and Burckley	6	26	64	36	132
8. Smith and Vance	3	0	2	0	5
9. Stanger	0	3	3	1	7
10. Thurber and Kilburn	7	6	7	1	21
11. Wolf, *et al.*	1	1	12	7	21
12. Miscellaneous *bona-fide* Texts	0	0	0	0	32
	35	85	182	76	410

Future Plans of Schools Not Now Offering Earth Science

In school systems where earth science is not taught at present, 138 principals indicated that they plan to offer earth science next year or in the near future. Another 38 principals said that they did not offer earth science because none of their teachers were qualified to teach it and because it was impossible to find qualified personnel. There were 29 principals who felt that they lacked time in the schedule, available facilities and rooms, or adequate finances to offer earth science at this time. Another 40 principals indicated that earth science was not taught as a separate course, but that much earth science material was included in their general science or physical science courses. All 245 of these principals were judged to have a positive attitude concerning the adoption of earth science in their curricula, and that when teachers and finances become available in the future, they will probably initiate earth science courses.

There were 137 principals from schools where earth science was not taught at the time of this survey who made no comments concerning the possibilities of offering earth science. A majority of these principals said that it had not been explored. Of the 100 principals who had explored the possibilities of offering earth science but did not initiate it, 50 said that there was not enough interest on the part of students, teachers, or the community. Others said that their present courses were adequate and that they saw no need for adding earth science or for dropping present offerings. Twenty-six principals said that earth science had been considered, but that they had decided to offer some other science course or to continue with what was presently offered.

Twenty-four principals said that earth science had been offered in the past, but had been dropped for one of the following reasons: (a) because the course was too difficult for the students taking it, (b) because there were not enough students enrolled, (c) because the qualified teacher had resigned and it was impossible to find a replacement, or (d) because consolidation had effected discontinuance of the course. A few of these principals said that they would probably offer it again when properly certified teachers became available. The remaining 35 principals made general comments revealing a neutral attitude toward initiating earth science.

The General Picture of Earth Science in Ohio Today

In summary, the results of this survey indicate that over half of the secondary schools in Ohio offer earth science in their school systems, with *410* schools offering a full-year course using a *bona-fide* earth-science textbook. Another *205* schools plan to offer earth science next year or in the near future, if qualified teachers can be found and facilities can be procured. There were only *137* principals who made no comment concerning the possibilities of offering earth science and only *100* principals who had explored offering earth science, but had decided to offer another course or did not feel there was enough interest to warrant offering earth science at this time.

Future of Earth Science in Ohio

There should be little doubt that a significant number of Ohio's secondary schools have embraced earth science as a full-year science offering, primarily at the eighth- and ninth-grade level. Backgrounds of teachers presently teaching earth science probably need upgrading, but there is also a tremendous and immediate need for colleges and universities to prepare more earth-science teachers. Secondary schools need to provide incentives for in-service and summer experiences to improve essential earth-science background for their teachers. It is now critical to think of earth science as a separate, autonomous field, worthy of equal status with biology, chemistry, and physics in the curricula of secondary schools. Earth-science teachers should have their own place in the science curricula of our secondary schools. The Earth Science Committee of the Ohio Academy of Science is making every effort to further these goals.

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